A blank for a container and a container made from said blank

Description

The present invention relates to a blank for a container, particularly a container wall, comprising an upper and lower peripheral edge and first and second connection edges laterally connecting the peripheral edges, each of said connection edges extending along overlap regions that are interconnectable for shaping the container.

The present invention also relates to a container that can be made from said blank, said container being provided, apart from the container wall, with at least one lower bottom member which is surrounded by the container wall and connected to the wall in fluid-tight fashion. Opposite to the bottom member, a discharge opening, which is optionally closable by a cover member, is surrounded by the container wall.

So far it has already been known in practice that such a blank or a container made therefrom is equipped in the container wall with at least one inspection opening that may be used for looking from the outside of the container into the interior of the container. This helps, for instance, to check the filling or filling level of the container and, optionally, also to check the quality of the container contents. Container contents of this type may e.g. be food which can be consumed through an upper discharge opening of the container, for instance beverage, yoghurt, ice cream, pourable or loose foodstuff, or the like.

To make such an inspection opening in the blank, said opening has so far been made by a separate tool in the corresponding blank. For instance, when it is produced by way of punching, it is not only the correspondingly punched-out part of the blank that has to be removed, but normally an ejector means has to be provided

in addition, whereby a detachment of the blank from the corresponding tool is made possible after the punching operation. The punched-out part is normally removed by suction, or the like. The production method for the blank and the corresponding apparatus are thus relatively complicated and expensive.

Furthermore, it should be noted that the blank or the container wall made from the blank has in part only a low stability or dimensional stiffness in the area of the inspection opening, depending on the material used for the blank. This may have the effect that leakage arises in the area of the inspection opening, which is e.g. caused during handling of the container and by corresponding pressure applied to the container in the area of the inspection opening.

It is therefore the object of the present invention to improve a blank or a container such that its manufacture is simplified and less expensive and that the inspection opening is made more stable and has a greater load bearing capacity at the same time.

This object is achieved by the features of claim 1 and claim 12, respectively.

Peripheral edges in at least each of the overlap regions along the first and second connection edges of the blank can be produced during a corresponding edge trimming without the need for separate tools for making corresponding openings in the blank outside the overlap regions. Since edge trimming is carried out at any rate during manufacture of the blank, said manufacturing step can simultaneously be used for making the corresponding peripheral openings. Due to the arrangement of the peripheral openings in the overlap region, the corresponding parts of the blank that have been removed for making the peripheral openings can be disposed off together with the waste parts arising during edge trimming. A separate disposal of waste parts formed outside the overlap regions is no longer necessary.

Accordingly, there is also no need for corresponding ejector means for detaching the blank e.g. from a punching tool for an otherwise standard inspection opening.

Since a peripheral opening is formed in at least each of the overlap regions, the inspection opening composed thereof after connection of the overlap regions is also arranged in the overlap region. Since at said place the wall thickness of the container is essentially twice as large as the remaining container wall due to the connection of the two overlap regions, the inspection opening is arranged in a reinforced area of the container and thus more stable and can be subjected to higher loads without loss in fluid tightness.

Furthermore, the detachment of the blank from the corresponding tool during edge trimming can be facilitated when the peripheral opening is designed as a peripheral recess that is open to the outside towards the connection edge. Said peripheral recesses will then overlap at least in part during shaping of the container with formation of the corresponding inspection opening.

To obtain a sufficiently large inspection opening with minimal efforts, it may be regarded as advantageous when the peripheral openings are entirely overlapping for forming the corresponding inspection opening and, optionally, have the same shape as well. To this end said peripheral openings may e.g. be arranged at the same distance from the upper and/or lower peripheral edge.

The manufacture of the peripheral openings and the detachment of the blank from the corresponding tools can further be facilitated when the peripheral openings have no sharp edges, but are rounded off.

It is possible that a corresponding peripheral opening extends beyond the overlap region into the blank. Due to the part of the peripheral opening arranged in the overlap region, the later stability of the inspection opening is improved at least in part. However, to improve stability as much as possible, the peripheral opening may be restricted to the respective overlap region and thus not extend into the remaining blank.

It is possible to provide a plurality of peripheral openings along an overlap region, wherein e.g. the distance of neighboring peripheral openings is changing from the lower peripheral edge to the upper peripheral edge. It is possible in this connection that the distances of the peripheral openings are decreasing towards the lower peripheral edge. It can thereby be checked in a better way how much contents is still left in the container. It may be more advantageous in terms of manufacture when the peripheral openings along an overlap region are equally spaced apart from one another. As a rule, such an equally spaced-apart arrangement is sufficient for checking the contents in the container.

It is possible that both the peripheral openings along an overlap region and the peripheral openings in the two overlap regions have different cross-sections when compared with one another. For instance, a relatively small peripheral opening might be formed near the upper peripheral edge that is sufficient for checking a level of the contents inside the container. The corresponding peripheral opening may be formed in the area of the lower peripheral edge with a greater length in the longitudinal extension of the overlap region to be able to check here in a better way if the container is empty. In a simple embodiment, however, it is also possible that all of the peripheral openings have the same cross-sections.

The corresponding peripheral openings may terminate at a distance from an inner overlap line of the overlap region. This ensures that there is also an adequate

connection surface of the overlap regions around or at least partly around the peripheral opening. To obtain, however, inspection openings that are as large as possible, it may turn out to be advantageous when the peripheral openings extend up to the inner overlap line of the overlap region. This is particularly regarded as an advantage in cases where the overlap regions have a small width only and adequately large inspection openings are nevertheless to be formed.

The peripheral openings may be designed such that the corresponding overlap line substantially touches the peripheral openings. However, it is also possible that the peripheral openings extend with their inner edge facing the overlap line at least in part along the overlap line.

The inspection openings in the container made from the blank might be closed in a fluid-tight manner by a film or a coating. To facilitate the application of a film or coating, it is possible that the peripheral opening is surrounded at least in part by a coating area. Said coating area serves, in particular, to fasten the film or to apply the coating outside the peripheral openings or inspection openings, resulting in improved fluid tightness. Said coating areas may extend both in the corresponding overlap regions and beyond said regions in the remaining blank.

Very different cross-sections are possible for the peripheral openings, thus resulting in very different cross-sections in the inspection openings. The cross-sections may e.g. be designed such that star-shaped, cross-like or also other cross-sections of the inspection openings are obtained that, apart from the inspection of the interior of the container, may have a positive effect on the optical appearance of the container under esthetic aspects. Simple cross-sections in this connection are circular or oval cross-sections. If the inspection opening is to extend over the larger length in the longitudinal direction of the overlap regions, slotted cross-sections are also possible for the inspection opening and corresponding cross-sections for the peripheral

openings. A corresponding width of the cross-section may further vary in the longitudinal direction of the overlap region.

During production of the container, the corresponding blank is deformed such that the overlap regions contact each other and are then interconnected to shape at least the container wall. Said connection can be established in the standard way by means of an adhesive or also by fusing a usually existing plastic coating of the blank material. Such blank materials are e.g. a corresponding plastic material, which is particularly food-compatible, or also paper or cardboard. The coating of said material is also a food-compatible plastic material which is particularly liquid-tight and optionally also gas-tight. It is possible that the material of the blank or the corresponding coating is also a sandwich material consisting of several layers of different materials.

The corresponding bottom member of the container may be made from the same material. The container may also be closed optionally by a cover member opposite to the bottom member, the corresponding discharge opening being positioned at said place.

There are various possibilities of connecting container wall and bottom member, for instance by bending the lower peripheral edge of the blank of the container wall towards the container interior and by forming a receiving channel for a peripheral flange of the bottom member. Said peripheral flange projects in the direction of the receiving channel and is inserted into said channel and then connected there in fluid-tight fashion to the container wall.

The corresponding upper peripheral edge of the blank may e.g. be flanged and/or flat-pressed to form a mouth roll or another opening edge. Mouth roll or a differently formed opening edge may here also serve to fasten the cover member.

As has already been explained further above, the inspection opening is sealed in a fluid-tight manner by a particularly transparent film or coating.

To avoid the fluid-tight sealing of each inspection opening individually, the corresponding film or coating may extend along the overlap region and thus seal all inspection openings at the same time, the openings being mounted on the inside and/or outside on the container.

As for the overlap regions, it should also be noted that these have a connection edge located in the container interior after the container wall has been shaped. It may here be regarded as an advantage when the film or coating for the fluid-tight sealing of the inspection openings covers at least also the connection edge arranged in the container interior. The connection edge may also be sealed separately, e.g. during punching or in a step subsequent to such a process.

Furthermore, it is possible that the film or coating serves not only the fluid-tight sealing of the inspection openings, but is also simultaneously used for connecting the overlap regions. This can e.g. be realized in that the film or coating extends from the container interior around the connection edge arranged in the container interior to at least the exterior connection edge. It is also possible that the externally located connection edge is additionally sealed by the film or coating. The film or coating may also be arranged between the interconnected overlap regions alone.

To make sure that an inspection of the container interior is possible through the inspection opening, it is self-evident that the film or coating is formed from a transparent or at least translucent material. It is also possible to provide the film or coating at least at places with an imprint and/or coloration. Such an imprint is e.g. a mark that marks the desired filling level of the container. In this way, it can easily be

checked whether the container has been filled properly. Further imprints are possible that serve advertising purposes. Due to the imprint and/or coloration, positive esthetic design features are also provided. It is also possible that the film or coating will change its color when the contents of the container is heated or cooled or is no longer in contact with the film or coating in the area of the corresponding inspection opening. The coloration may also change in response to the temperature of the container contents, so that it can e.g. be detected that or whether the container contents is or has been heated adequately.

To protect the inspection openings at least until use of the container, they can be covered on the outside on the container by a particularly flap-like cover. This protects the inspection openings during filling and corresponding handling of the container, during later transportation or classification of the containers. It is only when the container is used in accordance with its destination that the cover can optionally be opened or removed.

In case the cover is given a flap-like design, it may also be of advantage when it can be re-closed after having been opened. This can e.g. be accomplished in that the cover is self-adhesive and/or peelable. A corresponding self-adhesion is sufficient in the flap-like cover, for instance at the fold-away end of the cover. When the cover is removed, it may stay removed on the one hand or may optionally be applied again in case of self-adhesion.

When a corresponding blank or container is made, attention must be paid according to the method that the blank is normally punched out, cut out or produced in another way from a corresponding master piece to form upper and lower peripheral edges and the first and second connection edges laterally connecting the same. The blank produced in this way is then subjected to edge trimming, particularly in the area of

the connection edges. A corresponding edge trimming may optionally be carried out in the area of the upper and lower peripheral edges as well.

During edge trimming the corresponding peripheral openings are then produced at least in the overlap region or the overlap regions. Said blank which is provided with peripheral openings and trimmed along the edges is then bent for shaping the container wall and connected in fluid-tight fashion in the area of the overlap regions. At the same time with the connection, the inspection openings are produced from the peripheral openings of both overlap regions that are overlapping at least in part.

It should also be noted that edge trimming and production of the peripheral openings may either be carried out at the same time or one after the other. A further process step for making the corresponding container is the application of a film or coating in and/or between the interconnected overlap regions for the fluid-tight sealing of the inspection openings produced.

The corresponding film or coating may e.g. already be applied prior to connection of the overlap regions to seal e.g. also one or both peripheral edges in a fluid-tight manner or optionally also to serve as an adhesive during connection of the overlap regions.

Advantageous embodiments of the invention will now be explained in more detail with reference to the figures attached to the drawing, in which:

Fig. 1 is a top view on a first embodiment of a blank according to the invention;

Fig. 2 is a top view on a second embodiment of a blank according to the invention;

Fig. 3 is a top view on a third embodiment of a blank according to the invention;

Fig. 4 is a top view on a fourth embodiment of a blank according to the invention;

Fig. 5 is a top view on a fifth embodiment of a blank according to the invention;

Fig. 6 is a top view on a sixth embodiment of a blank according to the invention;

Fig. 7 is a top view on a seventh embodiment of a blank according to the invention;

Fig. 8 is a side view of a container made from a blank according to Fig. 5, in a cut state; and

Fig. 9 is a top view on a peelable cover for inspection openings.

Figs. 1 to 7 show seven different embodiments of a blank 1 according to the invention, like parts of the blank being marked with like reference numerals and only explained in part with reference to one figure.

The blank 1 according to Fig. 1 serves to shape a container wall 3 of a container 2; see also Fig. 8. The blank is surrounded by an upper curved peripheral edge 4 and a lower curved peripheral edge 5 and first and second connection edges 6, 7 laterally connecting the same. The connection edges 6, 7 extend in straight fashion and conclude overlap regions 8, 9. These are in contact with one another for shaping the container (see Fig. 8) and are interconnected in fluid-tight fashion.

The overlap regions 8, 9 have arranged therein peripheral openings 10 which are formed as peripheral recesses 16 that are open in the direction of a first and second connection edge 6, 7; see also the subsequent figures.

The overlap regions 8, 9 are defined by overlap lines 19, 20 at a distance from the respective connection edge 6, 7. The peripheral openings 10 extend with their inner edge 21 up to said overlap lines 19, 20. Said inner edge 21 may partly extend along the corresponding overlap line 19, 20; see also Fig. 6 or 7.

The peripheral openings 10 in the respective overlap region 8, 9 are arranged with the same cross-section and at the same distance from the lower peripheral edge 5. When the overlap regions 8, 9 are connected, the peripheral openings 10 will overlap to form a corresponding inspection opening; see reference numerals 13, 14 and 15 in Fig. 8.

In the embodiment according to Fig. 1, only one peripheral opening 10 is arranged in each of the overlap regions 8, 9, so that only one inspection opening is formed when the container wall 3 is being formed.

Further regions, which are marked by broken lines extending in parallel with the corresponding peripheral edges, extend along the upper and lower peripheral edges 4, 5. The corresponding region along the lower peripheral edge 5 serves to form a receiving channel 26 (see Fig. 8), and the region along the upper peripheral edge 4 serves to form a mouth roll 27 (see Fig. 8 once again).

The material of the corresponding blank 1 is, normally, paper or cardboard coated with a plastic film, the material of the plastic film being chosen such that the film is at least liquid-tight or optionally also gas-tight. Furthermore, the film may also serve to connect the overlap regions during shaping of the container wall 3 in that the film is fused by the action of heat and will connect the overlap regions in a fluid-tight manner after solidification.

The embodiment according to Fig. 2 differs from the embodiment according to Fig. 1 by a further peripheral opening 11 in each of the overlap regions 8, 9.

This applies by analogy to the third embodiment according to Fig. 3; in this embodiment the corresponding peripheral openings 12 in each of the overlap regions 8, 9 are arranged closer to the upper peripheral edge 4 in comparison with the embodiment according to Fig. 2.

Finally, Fig. 4 shows a fourth embodiment in which three peripheral openings 10, 11, 12 are arranged in each of the overlap regions 8, 9, the corresponding peripheral openings being spaced apart from one another at the same distance and provided with the same cross-section.

In the embodiments of Figs. 2 and 3, two inspection openings each are obtained in the container wall 3, and three inspection openings in the embodiment according to Fig. 4.

Figs. 5 and 6 show further embodiments which show by way of example that the peripheral openings 10 and 12 are each spaced apart at the same distance 17, 18 from the upper or lower peripheral edge 4, 5. The corresponding peripheral openings have a semicircular cross-section, which is extended in the direction of the respective connection edges 6, 7. In this instance, the respective overlap line 19, 20 is substantially tangential to the respective peripheral opening 10, 11, 12.

In the embodiment according to Fig. 6, the corresponding peripheral openings 10, 11, 12 extend each with their inner edge 21 along part of the associated overlap line 19, 20, resulting in an elongate oval cross-section in the inspection openings formed.

The inspection openings 13, 14, 15 according to Fig. 8 are substantially formed by the peripheral openings 10, 11, 12 according to Fig. 5, said inspection openings having a circular cross-section.

Of course, it is also possible that in each of the embodiments a larger number of peripheral openings are formed or that they are not distributed in the longitudinal direction of the overlap regions in a uniform manner, but in different ways. For example, the peripheral openings may be arranged in the neighborhood of the lower peripheral edge 5 at a smaller distance or also with a distance decreasing from the upper to the lower peripheral edge. Further variations in both the cross sections of the corresponding peripheral openings and in their distribution and arrangement of the overlap regions are evident.

It is also possible that the peripheral openings extend over the respective overlap region or overlap line 19, 20 into the remaining blank 1.

Another possibility regarding the peripheral openings is that these are provided in the respective overlap region or also along an overlap region with different cross-sections that optionally only overlap in part upon connection of the overlap regions for forming corresponding inspection openings.

In the embodiment according to Fig. 7, only one peripheral opening 10 is arranged in each of the overlap regions 8, 9. Said opening 10 extends over a large part of the length of each overlap region 8, 9 between upper and lower peripheral edge 4, 5. This yields a substantially slotted inspection opening in the finished container.

In the embodiment according to Fig. 7, there is additionally shown a coating region 22, 23 next to each peripheral opening 10, said region surrounding the opening in

the area of the corresponding blank 1. Corresponding coating regions 22, 23 can also be formed for the peripheral openings 10, 11, 12 of the preceding embodiments.

In the finished container 2, see Fig. 8, and in the finished container wall 3, the coating regions 22, 23 serve to provide or apply a corresponding film or coating 28; see Fig. 8 once again.

It is also true for the embodiment shown in Fig. 7 that the peripheral openings 10 arranged in the respective overlap regions 8, 9 need not be similar, but they may e.g. also extend over the overlap line 19, 20 in the remaining blank or they may also be arranged in offset fashion relative to one another in the longitudinal direction of the overlap regions 8, 9.

However, the installation or application of the film or coating 28 is normally facilitated when the corresponding peripheral openings 10, 11, 12 are made similar or overlap each other entirely.

Fig. 8 shows a side view of a container 2 which is cut through in the middle and has a container wall 3 made from a blank according to Fig. 5. The corresponding overlap regions 8, 9 are arranged in overlapping fashion and interconnected in a fluid-tight manner. With a superimposed arrangement of the overlap regions 8, 9, the corresponding peripheral openings 10, 11, 12 are also overlapping, thereby forming the inspection openings 13, 14, 15.

At the lower end, the container 2 comprises a bottom member 24. Said bottom member has a downwardly projecting peripheral flange 32 surrounding the same, which is inserted into a receiving channel 25 of the container wall 3. The receiving channel 25 is formed by bending the lower peripheral edge 5 upwards, and upon

insertion of the corresponding peripheral flange 32 of the bottom member 24 said member is connected to the receiving channel 26 in a fluid-tight manner.

At its upper end, the container 2 has a discharge opening 25 which is surrounded by a mouth roll 27 or a similar edge. The mouth roll 27 is formed by flanging the upper peripheral edge 4.

In the container interior 29 and/or on its outside, a film or coating 28 is applied along the overlap regions 8, 9 for a fluid-tight sealing of the inspection openings 13, 14, 15. It is possible to use a film or coating 28 for sealing all inspection openings 13, 14, 15. In the area of the inspection opening 13, the film/coating 28 comprises a level mark as an imprint 30 and may optionally be colored.

The film or coating 28 may also extend from the container interior 29 around the interior first connection edge 6 up to the outside of the container 2 and especially up to the exterior second connection edge 7 and also seal the same optionally in a fluid-tight manner.

As can particularly seen in Fig. 8, the inspection openings 13, 14, 15 only extend in the interconnected overlap regions 8, 9, so that they are surrounded by a double-layer material of the blank 1, whereby stability is improved in the area of the inspection openings.

On the outside on the container 2, an optionally flap-like cover 31 may additionally be arranged for covering the inspection openings 13, 14, 15. This cover is shown in a rectangular configuration in Fig. 9. The cover 31 can be fastened along one of its longitudinal edges to the container 2, while the other longitudinal edge can be folded away from the container for exposing the inspection openings 13, 14, 15 and for inspecting the container interior 29. In the area of the fold-away longitudinal edge, it

is possible to fasten said edge in a detachable manner to the container exterior. As a result, the cover can be closed again. It is also possible to fasten the fold-away longitudinal edge of the cover 31 by means of a one-time connection to the container exterior at the beginning, so that it can be detected whether the flap has already been opened before.

The cover 31 may also be designed as a substantially strip-like, self-adhesive and/or peelable strip cover, see Fig. 9.

Containers according to the invention and the corresponding blank, respectively, are characterized by an easy production of the corresponding inspection openings and arrangement of the inspection openings in the overlap regions. This special arrangement yields an enhanced stability in the area of the inspection openings. Furthermore, there is no separate waste during production of the inspection openings because these can be produced together with the trimming of the corresponding edges and can be removed with the resulting waste. Especially thanks to the configuration of the peripheral openings as open peripheral recesses, no measures are needed, for instance ejector means or the like, that require a separation of the blank from the respective tool after manufacture of the openings.